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Planting

TREES *and* HARDWOOD CUTTINGS *on the Canadian Prairies*

Vigorous young evergreens in shelterbelt

Experimental Farms Service

DEPARTMENT OF AGRICULTURE • OTTAWA, CANADA

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THE following instructions for planting trees and hardwood cuttings have been prepared having in mind particularly tree seedlings of small size such as are distributed by Dominion Forest Nursery Stations for prairie farm planting. It is hoped, however, that this publication will be helpful to all planters of trees and shrubs.

The general instructions apply to broadleaf trees, and special instructions for handling evergreen trees are given in a separate section. A section is also devoted to the transplanting of established trees.

PLANTING TREES AND HARDWOOD CUTTINGS ON THE CANADIAN PRAIRIES

BY

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Planting Trees

When to Plant

The best time to plant trees in the prairie region is in the early spring, around the first of May, when most plants are dormant. At that season soil moisture is plentiful, and other climatic conditions are favourable for the trees to become properly established. In addition, they have a long growing season in which to develop strong roots and tops before winter. If only a limited number of trees are being set out and can be handled with special care, they may be successfully planted in the fall also. Planting should be done on a dull, cloudy day or in the early evening.

Planting Procedures

The ground in which trees are to be planted should not be manured immediately prior to planting, nor should manure be placed near tree roots at planting time. This is especially true with evergreens.

If trees have been ordered from the Dominion Forest Nursery Station or a commercial nursery, they should be called for promptly on receipt of notice of their arrival, and unpacked immediately. If they cannot be planted at once bundles should be untied and the roots thoroughly moistened. The trees may then be placed in a shallow trench in some shady, cool place and the roots covered with moist earth. This is termed "heeling in". Trees properly heeled in will remain in good condition for two weeks or longer.

The seedlings should never be left exposed to the sun or wind, and care should be taken to prevent the roots—especially those of evergreens—from drying out. Seedlings of nearly all trees are likely to die if they are not planted at least as deeply as they originally stood in the nursery. Preferably set them about one inch deeper, as the soil will probably settle in the course of a few days after planting. During planting operations, the seedlings should be carried in pails or other containers half filled with muddy water, or kept covered with wet burlap and peat moss.

Small seedlings with a single straight tap root may be planted with a dibble, but a spade will give better results. The tips of all projecting roots should be trimmed off.

Unless the weather becomes very dry and hot, and remains so, trees should not require watering after spring planting. If conditions permit and irrigation equipment is available, one or two waterings throughout the season will be beneficial to newly planted trees, particularly evergreens. In a dry fall a good watering before winter will also be helpful.

Use of the Walking Plough

The quickest and perhaps the best way to plant young tree seedlings in large numbers is in a furrow. The furrow should be ploughed out twice, in opposite directions, as deeply as possible. In heavy soils it may be ploughed in one direction in the fall. This will facilitate planting, and there will be less drying out of the soil after planting is done. When the ploughing is done in spring it is advisable not to open the furrow too far ahead of the planters as the soil dries out rapidly.

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The tree seedling should be held by the top with the lower part of the root resting on the bottom of the furrow. Enough soil to cover the roots should be drawn in with the feet, from each side of the furrow, and tramped down firmly so that the seedlings cannot be pulled out easily. If the furrow is not deep enough, the lower tip of the root may be trimmed off with a sharp knife, or a deeper hole may be made in the bottom of the furrow with a shovel or hoe.

When the trees are all in place the furrow should be filled in at once. To eliminate the possibility of disturbing the newly-planted trees, filling in should be done with a hoe, rake, shovel, or cultivator. The soil should not be hilled up around individual trees; it is better to leave a depression around each to hold moisture.

Fig. 1: Upper: The trees are set in place.
Lower: The tractor wheel firms the soil near the tree roots, and the plough fills in additional soil.

Tractor-drawn Plough

Planting trees in a furrow opened with a walking plough is a "filling-in" job, and this method is vastly superior to digging holes with a spade or shovel for individual trees. However, greater speed and sustained interest, as well as better survival of trees, may be expected where a properly adjusted tractor-drawn gang plough is used instead. Rubber-tired tractors are preferable.

The necessary adjustments for tree planting can be made readily on a gang plough. Because trees are to be planted in the last furrow made by the gang plough, this furrow should be ploughed out as deeply as possible. The trees and cuttings should then be set along the straight edge or face of the furrow the required distance apart, and kept upright by placing enough moist soil around the roots of each tree to hold it in place. This step in tree planting can best be done by two people, one placing the trees, the other filling in the soil with hoe, rake, or shovel. Only a short length of furrow should be ploughed out ahead of the planters.

On the return trip with the tractor and gang plough, the plough may be adjusted to fill in additional soil around the trees. The soil is made firm near the tree roots by the tractor wheel passing over it, and loose soil is ploughed onto the tree roots by the properly adjusted leading plough. The remaining ploughs of the gang turn over furrows that are progressively shallower. The last furrow is little more than a scarification of the soil surface.

Tree-planting Machines

Trees may also be planted with tree-planting machines. Such machines are expensive but have a place, particularly in municipal or other large-scale plantings, where tree planters are willing to co-operate in their use. The main advantages of using these machines are: (1) the soil in which the trees are planted is never exposed to drying out by sun and wind; (2) during the one operation the furrow is opened, the trees are set, and the furrow is filled in; (3) from machine-planting a higher survival and stronger rate of growth may be expected, provided planting material is satisfactory and other conditions are favourable at planting time.

Below: Tree-planting machine in operation. The seedlings are kept in containers within easy reach of each planter.
Right: The soil is packed firmly around the tree roots by these 16 x 600 tires.

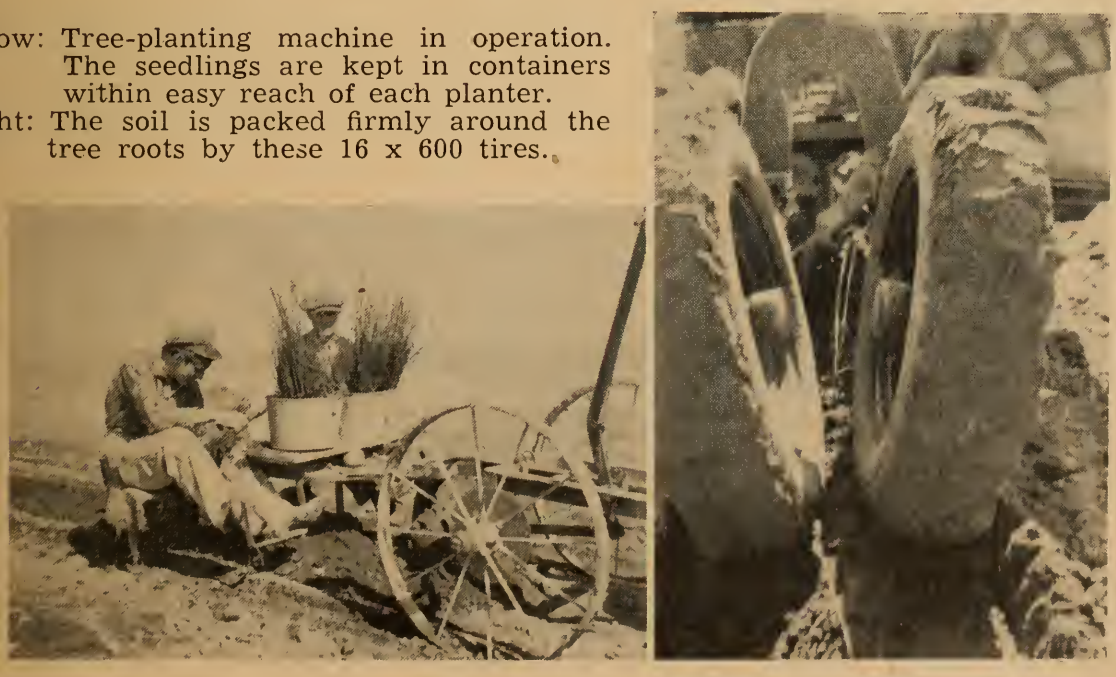


Fig. 2: Mechanical planting of tree seedlings.

Small trees from 12 to 24 inches high, of both evergreen and broadleaf species, may be planted with machines. The rows may be spaced four or more feet apart, depending on the cultivation implements to be used, and any desired distance between trees may be decided upon. Slow-speed tractors are desirable for hauling tree-planting machines, but even with these it is likely to be difficult to space some seedlings, Caraganas for instance, one foot apart in the row.

Evergreens Require Special Care

Evergreens will not succeed in alkaline soil; and as already stated, the ground in which they are to be planted should never be manured. Neither should manure be placed around the roots when planting. The trees should be unpacked as soon as they are received, and the roots kept continually moist. To ensure this the roots should be dipped in muddy water and the trees heeled-in in moist soil, and shaded from the sun. Exposure to sun and wind for even a few minutes will kill the young plants. Fibrous feeder roots of young evergreens need not be pruned.

The spacing of evergreens may be close or wide depending upon the purpose to be served. Spacing six to eight feet apart in staggered rows will permit unrestricted development, but if dense shelter is desired the trees should be spaced four feet apart in the row. To obtain the best results with evergreens in farm shelterbelts they should be planted in rows by themselves, within the protection of other (broadleaf) tree rows. Care must be taken to set the trees deeply enough; and to spread the roots out and pack the soil firmly around them.

If, immediately after planting, a shingle, piece of board, or similar protection is placed on the south side of each tree to shade it from the sun, better survival will likely result. It may be advisable, particularly in dry seasons, to keep the shade on plants for several months.

If possible, provision should be made for holding snow on the young trees during winter. A row of corn or sunflowers sown thickly alongside the belt, not closer than three feet on each side of the tree row, and left standing all winter, answers the purpose splendidly. The seedlings will benefit from such protection for the first two seasons, or even longer, while they are becoming established. After vigorous height growth commences this shading is less important, but some obstruction such as that mentioned above should be maintained for a year or two longer. This will ensure snow coverage through the winter and early spring months, and give some protection until the small trees are making strong annual growth.

Care of Unplanted Trees

Despite careful plans, prospective planters occasionally find it necessary, as spring approaches, to decide against planting trees that have been ordered from Dominion Forest Nursery Stations. The simple solution is to cancel the order; but it is better to accept the shipment for several reasons. In the first place last minute cancellations of tree allotments make it difficult to re-allot the trees to planters who can use them. In addition all office and filing details involved in making allotments and preparing planting plans must be repeated in the following or in a subsequent year. From the standpoint of the grower there is some advantage in having trees readily at hand for planting when and where they are needed—later in the same season, or in the following spring. Even if the trees cannot be planted in the place intended for them, they may be heeled-in for future planting.

Heeling-in involves lining out the trees in a deep furrow, preferably in a sheltered, well-drained place in the garden. The trees should be laid on the ploughed-out soil, placed close together, touching or perhaps two layers deep, and the roots should be covered with friable, moist soil. This lining out of trees should be completed immediately after they are received, while the ground is cool and moist.

Fig. 3: Young tree seedlings heeled-in awaiting planting time.

It is a good plan to first place a few inches of soil over the roots; then pack the soil firmly with the feet and water it thoroughly. After the water has soaked into the ground, additional soil needed to cover the roots sufficiently may be put in place, and firmed only slightly. A shallow depression should be left along the row to hold all available rain water. If the season is dry, these trees may require water occasionally to keep them alive and growing.

Transplanting Established Trees

Home owners in town or country frequently have occasion to replant established trees. These may be growing in an unsuitable place in the home surroundings; they are perhaps crowded too close to other trees; there is opportunity to secure them from the neighbourhood commercial nursery; or they are readily available in a nearby native grove. Making use of trees that have made reasonable development and growth has obvious advantages.

Established trees may be transplanted in early spring or in early winter, but spring is the time recommended for transplanting such trees into unprotected and exposed sites. If it is decided to transplant in early spring the work should be done as soon as the frost is out of the ground. Care should be taken not to disturb or injure the roots and as much soil should be retained around them as possible. This will mean digging a trench around each tree at a radius of one and one-half feet or more from the trunk. This trench must be deepened

and extended underneath the tree so that the majority of the strong roots may be severed at a depth of about one and one-half feet, depending on the nature of the root system.

Transplanting in early winter should be delayed until the ground is sufficiently frozen to permit lifting the tree with a frozen ball of soil around the roots. However, the preliminary work of digging around and under the ball of soil may be done before the ground freezes. In addition a hole large enough to accommodate the roots of each tree should be dug in its new location before freeze-up, and some unfrozen soil should be made available to pack into the hole around the frozen ball of soil.

When trenching is finished, strong burlap or sacking of sufficient size to completely envelope the ball of soil around the roots may be laid in the trench, so folded that it can be spread easily under the tree. The tree with its ball of

Fig. 4: Upper: A trench has been dug to accommodate these well-grown evergreens.

Lower: Slip scraper and tractor may be used for moving trees a short distance.

soil should then be eased gently onto the burlap; and at the same time unsevered roots should be cut with a sharp spade or mattock. The next step is to fold and tie the burlap securely around the ball of soil in readiness for transporting the tree to its new location. The burlap serves to hold the soil in place and also prevents the roots from drying out.

A stone-boat is satisfactory for short-distance moving, and for very short distances a tractor and slip scraper may be used. This ingenious and simple method is illustrated in Figure 4. A truck, trailer, or sleigh will be useful for longer distances; and for loading and moving large trees a wrecker car derrick may be of service.

After transplanting, the trees should be thoroughly watered by pouring a pailful of water around the roots of each tree; and the hole should be filled with friable soil. It may be advisable to prune back some of the outermost and uppermost branches of broadleaf trees. In some instances the top may be safely reduced by one-third, and the branches and stems cut back to where there are vigorous, healthy buds. From these buds new shoots may be expected to develop.

Trees moved from native groves or woods should be selected carefully, as they develop best in locations and types of soil similar to those in their natural habitat. For example, trees from swamp areas will not grow well on high ground under semi-arid conditions. Among evergreens, cedars, mugho, and white pines are more easily transplanted than junipers, most spruces, and other pines. Tall trees may need to be supported for a year or two by stakes or guy wires to keep them upright.

If the site is favourable in every respect, transplanting should be successful in the majority of cases.

Planting Hardwood Cuttings

When to Take Cuttings

Among the species easily propagated by cuttings are willows, poplars, and cottonwood. Cuttings may be made in the spring before growth starts, or at any time during the fall, after the leaves have fallen. Cuttings taken in the spring will probably give the best results, and if stock can be obtained in the vicinity and only a small number are needed, it is advisable to make them at that time. The material should not be allowed to dry out.

Making the Cuttings

The best cuttings are obtained from well matured shoots of the current (or previous, if made in the spring) season's growth. Discard any shoots that may have been injured by frost or other causes. Cuttings are generally made from 8 to 12 inches long, from shoots one-quarter to one-half inch in diameter, though larger and smaller shoots will root under favourable conditions.

It is not advisable to use the terminal portion of a shoot for a cutting, or a shoot that has grown extremely vigorously or late in the season. Shoots of this nature, and the terminal portions, are usually too soft or pithy in structure to provide good cuttings. It is better to use the lower and woodier portions, which have developed more slowly and matured early in the fall.

Storing Hardwood Cuttings

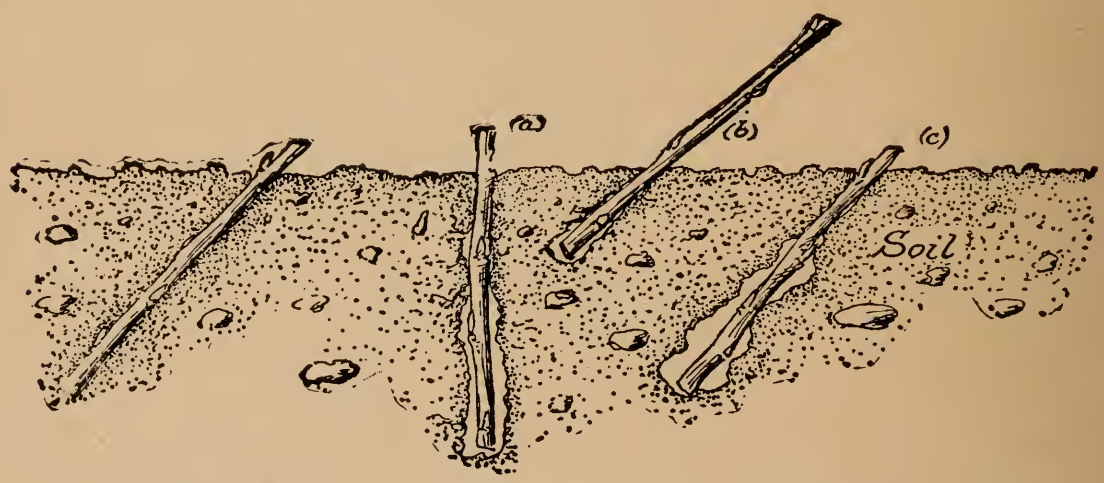
Cuttings made in the fall should be tied in bundles, with from 10 to 25 cuttings in each bundle, and then buried at once in moist but well drained soil where they may remain until time for planting in the spring. Hardwood

cuttings may also be stored indoors, in the cellar or root house, during winter. For best results cuttings should not freeze too hard during the storage period; neither should they alternately freeze and thaw during storage. The storage temperature should be about 34 degrees Fahrenheit.

Planting the Cuttings

The best time to plant hardwood cuttings is around the first of May. The soil for planting must be mellow and contain plenty of moisture.

If cuttings have been ordered, the shipment should be unpacked as soon as it is received and the cuttings either put in water or buried in moist soil. They should not, however, be left covered in this way for more than a few days. Before planting, it is advisable to soak the cuttings in water for a few hours, or even a whole day. While planting, cuttings, like seedlings, should be carried in pails or other containers half filled with muddy water, or kept covered with wet burlap and peat moss. They will spoil quickly if they are allowed to dry out, but almost every cutting will grow if it is kept moist before planting, and properly planted.



Correctly Planted

1. Set in ground on slant.
2. Soil well firmed and in close contact with the whole length below ground
3. Only one bud above ground.

Improperly Planted

(a) Too upright—Soil loose, only in contact with cutting at surface of ground
(b) Much too shallow. Soil too loose
(c) Cutting at right depth and correct slant but soil not in contact with lower part of cutting which would dry out before roots could form.

Most failures result from too shallow planting, therefore never allow more than an inch or an inch and one half of the cutting to project above ground. Cuttings should be planted on a slant, with the buds pointing upward; and a cutting should never be pushed into the soil, but should be placed carefully in a hole made by a stick, dibble, or spade. The soil must be well firmed and in close contact with the whole length of the portion below ground. For this reason a dibble is often unsatisfactory, and better results will follow the use of a spade. The spade should be thrust into the ground in a slanting direction, the handle lifted and the cutting put in under the spade. The spade should then be drawn out, allowing the soil to fall back into place. The soil should then be firmly tramped.

When Planting Trees Observe the Following Points Carefully

1. Keep the roots moist until the trees are planted, and keep the plants shaded from the sun.
2. Do not discard any seedlings because they appear to be too small. They are all well rooted and will grow well if properly planted.
3. Set the trees out according to the plan and instructions that you have received.
4. Plant seedlings one or two inches deeper than they originally stood in the nursery.
5. Pack the soil firmly around the roots.
6. Place a shingle or similar protection on the south side of newly-planted evergreen trees. A late-sown row of corn or sunflowers will give added protection, and help to hold snow in winter.
7. If trees are not planted according to instructions and plans, or as nearly so as conditions will permit, additional seedlings for further planting will not be supplied by the Department.

Ottawa—Edmond Cloutier, C.M.G., O.A., D.S.P., Printer to the King's Most Excellent Majesty, 1951.

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